WHAT IS CLAIMED IS:

1. A vertical cavity laser array device for producing multimode laser output, comprising:

a) a substrate;

b) a bottom dielectric stack reflective to light over a predetermined range of wavelengths and being disposed over the substrate;

c) an active region for producing laser light;

d) a top dielectric stack spaced from the bottom dielectric stack and reflective to light over a predetermined range of wavelengths;

e) the active region includes one or more periodic gain region(s) and spacer layers disposed on either side of the periodic gain region(s) and arranged so that the periodic gain region(s) is aligned with the antinodes of the device's standing wave electromagnetic field;

f) means for providing an array of spaced laser pixels which have higher reflectance than the interpixel regions; and

g) the spaced laser pixels having different sizes and the spacings between pixels having the same or different lengths to cause the vertical cavity laser array device to produce multimode laser output.

2. The vertical cavity laser array device of claim 1 wherein the array providing means include an etched region formed in a surface of the bottom dielectric stack to define an array of spaced laser pixels which have higher reflectance than the interpixel regions.

3. The vertical cavity laser array device of claim 2 wherein a planarization layer is formed between the etched surface of the bottom dielectric stack and the active region.

4. The vertical cavity laser array device of claim 3 wherein the planarization layer includes polyimide or SiO_2 and is thinned by a chemical mechanical polishing system.

5. The vertical cavity laser array device of claim 3 wherein the planarization layer includes polymethyl-methacrylate.

6. The vertical cavity laser array device of claim 1 wherein the bottom dielectric stack has a first portion and a second portion, whereby an etched region is formed in a surface of the first portion of the bottom dielectric stack to define an array of spaced laser pixels which have higher reflectance than the interpixel regions.

7. The vertical cavity laser array device of claim 6 wherein a planarization layer is formed between the etched surface of the first portion of the bottom dielectric stack and the second portion of the bottom dielectric stack.

8. The vertical cavity laser array device of claim 7 wherein the planarization layer includes polyimide or SiO_2 and is thinned by a chemical mechanical polishing system.

9. The vertical cavity laser array device of claim 7 wherein the planarization layer includes polymethyl-methacrylate.

10. The vertical cavity laser array device of claim 1 wherein pump-beam light is transmitted and introduced into the active region through at least one of the dielectric stacks.

11. The vertical cavity laser array device of claim 1 wherein one or more periodic gain region(s) is a combination of an organic host material and a dopant and the spacer layers are substantially transparent to pump-beam light and laser light.

12. The vertical cavity laser light producing device of claim 11 wherein the host material is aluminum tris(8-hydroxyquinoline), the dopant is [4-

(dicyanomethylene)-2-t-butyl-6-(1,1,7,7-tetramethyljulolidyl-9-enyl)-4H-pyran], and the spacer layer includes 1,1-Bis-(4-bis(4-methyl-phenyl)-amino-phenyl)-cyclohexane or silicon dioxide.

13. The vertical cavity laser light producing device of claim 1 wherein the periodic gain region(s) includes polymeric materials.

14. The vertical cavity laser array device of claim 1 wherein the spacing between pixels is in the range of from 0.25 to 4 microns.

15. The vertical cavity laser array device of claim 1 wherein the size of the pixels is in the range of from 2.5 to 20 microns.

16. The vertical cavity laser array device of claim 1 wherein the pixels are arranged in a linear array.

17. The vertical cavity laser array device of claim 1 wherein the pixels are arranged in a periodic two-dimensional array.

18. The vertical cavity laser array device of claim 1 wherein the pixels are arranged randomly in a two-dimensional array

19. A vertical cavity laser array device for producing multimode laser output, comprising:

a) a substrate;

b) a first dielectric stack reflective to light over a predetermined range of wavelengths;

c) an active region for producing laser light;

d) a metallic layer spaced from the first dielectric stack and reflective to light;

e) the active region includes one or more periodic gain region(s) and spacer layers disposed on either side of the periodic gain region(s)

and arranged so that the periodic gain region(s) is aligned with the antinodes of the device's standing wave electromagnetic field;

f) means for providing an array of spaced laser pixels which have higher reflectance than the interpixel regions; and

g) the spaced laser pixels having different sizes and the spacings between pixels having the same or different lengths to cause the vertical cavity laser array device to produce multimode laser output.

20. The vertical cavity laser array device of claim 19 wherein the array providing means include an etched region formed in a surface of the bottom dielectric stack to define an array of spaced laser pixels which have higher reflectance than the interpixel regions.

21. The vertical cavity laser array device of claim 20 wherein a planarization layer is formed between the etched surface of the bottom dielectric stack and the active region.

22. The vertical cavity laser array device of claim 21 wherein the planarization layer includes polyimide or SiO_2 and is thinned by a chemical mechanical polishing system.

23. The vertical cavity laser array device of claim 21 wherein the planarization layer includes polymethyl-methacrylate.

24. The vertical cavity laser array device of claim 19 wherein the bottom dielectric stack has a first portion and a second portion, whereby an etched region is formed in a surface of the first portion of the bottom dielectric stack to define an array of spaced laser pixels which have higher reflectance than the interpixel regions.

25. The vertical cavity laser array device of claim 24 wherein a planarization layer is formed between the etched surface of the first portion of the bottom dielectric stack and the second portion of the bottom dielectric stack.

26. The vertical cavity laser array device of claim 25 wherein the planarization layer includes polyimide or SiO_2 and is thinned by a chemical mechanical polishing system.

27. The vertical cavity laser array device of claim 25 wherein the planarization layer includes polymethyl-methacrylate.

28. The vertical cavity laser array device of claim 19 wherein pump-beam light is transmitted and introduced into the active region through at least one of the dielectric stacks.

29. The vertical cavity laser array device of claim 19 wherein one or more periodic gain region(s) is a combination of an organic host material and a dopant and the spacer layers are substantially transparent to pump-beam light and laser light.

30. The vertical cavity laser light producing device of claim 29 wherein the host material is aluminum tris(8-hydroxyquinoline), the dopant is [4-(dicyanomethylene)-2-t-butyl-6-(1,1,7,7-tetramethyljulolidyl-9-enyl)-4H-pyran], and the spacer layers include 1,1-Bis-(4-bis(4-methyl-phenyl)-amino-phenyl)-cyclohexane or silicon dioxide.

31. The vertical cavity laser light producing device of claim 19 wherein the periodic gain region includes polymeric materials.

32. The vertical cavity laser array device of claim 19 wherein the spacing between pixels is in the range of from 0.25 to 4 microns.

33. The vertical cavity laser array device of claim 19 wherein the size of the pixels is in the range of from 2.5 to 20 microns.

34. The vertical cavity laser array device of claim 19 wherein the pixels are arranged in a linear array.

35. The vertical cavity laser array device of claim 19 wherein the pixels are arranged in a periodic two-dimensional array.

36. The vertical cavity laser array device of claim 19 wherein the pixels are arranged randomly in a two-dimensional array.